

**Name of Lesson:** Don't Blow It

**Grade Level:** 4<sup>th</sup>

**Subject:** Science

**Prepared By:** Rachel Luke

<b>Overview and Purpose:</b> Students will be able to identify the uses of resistors and create a functioning circuit online.	<b>Education Standards Addressed:</b> 4.1P.1 Describe the properties of forms of energy and how objects vary in the extent to which they absorb and conduct energy.
---	---

	<b>Teacher Guide</b>	<b>Student Guide</b>	
<b>Objectives:</b>	To explain the purpose of a resistor and identify situations in the real world where it is useful.	<b>Key Question:</b> How can we control electricity and make it useful in our world?	<b>Materials Needed:</b>
<b>Information:</b>	Electrical resistance can be thought of as sticking your hand out a car window. The faster [current] you drive the harder the wind presses [resistance] against you hand and therefore it takes more energy [voltage] to hold you steady. The resistor is the most common electronic component and is used to limit and/or control the voltage and current in an electronic circuit.	Student will have prior knowledge from the FOSS lesson that allows students to see a parallel circuit in action.	<ul style="list-style-type: none"> <li>• Rope</li> <li>• Signs with a picture of a bulb, three batteries and a resistor</li> <li>• Playing Cards</li> <li>• Wire</li> <li>• Lightbulbs</li> <li>• C Batteries</li> <li>• Resistors</li> </ul>
<b>Activity:</b>	An LED is a small red light (such as the one on the front of most TVs) and requires 2.0 volts and 0.02 amps to operate correctly. If	After participating in the human circuit provide by FOSS materials and creating a circuit with batteries, wires and bulbs, the teacher will	<b>Other Resources:</b> <ul style="list-style-type: none"> <li>• <a href="http://www.article19.com/shockwave/oz.htm">http://www.article19.com/shockwave/oz.htm</a></li> </ul>

	we connected that LED up directly to a 12 volt battery, the voltage would be too high, and too much current would flow... the LED would blow up.	connect multiple batteries to a bulb until the bulb explodes. The class will then discuss ways of protecting the bulb without removing the energy source and brainstorm some potential uses of the excess energy.	
<b>Verification:</b>		At this point the class will again demonstrate what has happened with the batteries and bulb with the human circuit and show that the bulb is getting too many electrons too quickly, causing it to explode and release the electrons. We will then introduce a resistor into both the human circuit as well as a new bulb with the same number of batteries.	
<b>Summary:</b>	We need to use a resistor to limit the voltage and current.	Students will use OHM Zone online to create circuits that use resistors. They can also use to test the number of electrons that are travelling through the circuit as well how the resistors are regulating the flow.	<b>Additional Notes:</b> <a href="http://www.article19.com/shockwave/oz.htm">http://www.article19.com/shockwave/oz.htm</a>